

1. A semiconductor storage device comprising:
a first insulating film formed on a semiconductor
substrate;

10 a contact hole formed between said first and
second wirings, and in said first insulating film
between said first and second wirings; and

2. A device according to claim 1, wherein said second insulating film is a silicon nitride film, and said first insulating film is a silicon oxide film.

4. A device according to claim 1, wherein said third insulating film is a silicon oxide film or a composite film of a silicon nitride film and a silicon oxide film, and has a smaller dielectric constant than a silicon nitride film.

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a bit line connected to one region of said source/drain region, said bit line being located so as to intersect perpendicularly to a word line connected to said gate electrode;

a first insulating film covering said MOS transistor, said bit line being located on said first insulating film;

a third insulating film formed on said first

a contact hole for forming a storage node electrode of said capacitor formed through said third insulating film and said first insulating film, said contact hole exposing a side face of said bit line; and

6. A device according to claim 5, wherein said third insulating film is a silicon nitride film, and said second and fourth insulating films are silicon oxide film.

7. A device according to claim 5, wherein said

8. A device according to claim 5, wherein said contact hole for said storage node is divided by a linear/space pattern which intersects perpendicular to said bit line.

an MOS transistor having a gate electrode and a source/drain region, said MOS transistor being formed on a surface of a semiconductor substrate;

a capacitor formed above said bit line, said capacitor being connected to the other region of said source/drain region;

a second insulating film formed on said bit line;

film;

a third insulating film formed on said first insulating film and said conductive film;

5 a fourth insulating film formed at least on a side wall of said bit line exposed from said contact hole and a side wall of said first insulating film; and

10. A device according to claim 9, wherein said fourth insulating film is a silicon oxide film or a composite film of a silicon nitride film and a silicon oxide film, and has a smaller dielectric constant than a silicon nitride film.

12. A semiconductor storage device comprising:
a semiconductor substrate;
an element separation insulating film, formed on
said semiconductor substrate, for dividing an element
region;

a contact hole for storage node, located on the side of said bit line and formed through said fourth insulating film and said second insulating film, said

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16. A semiconductor storage device comprising:
a semiconductor substrate;

5 a plurality of MOS transistors formed in the
element regions, said MOS transistors respectively have
a gate insulating film, a gate electrode connected to
a word line and a source/drain region;

10 first contact holes, formed on said first
insulating film, reaching one source/drain regions of
said MOS transistors;

a first conductive plug for filling up said
respective first contact holes;

20 a second insulating film for covering said first
insulating film and said first and second conductive
plugs;

bit lines formed respective on said second
insulating film and said bit line contact, an lower

part of said respective bit lines being composed of a conductive film and upper part being composed of said third insulating film;

5 a fourth insulating film formed on said second insulating film and said bit lines;

a contact hole for a storage node, locating between said bit lines and formed through said fourth insulating film and said second insulating film, said contact hole reaching said second conductive plug;

10 a fifth insulating film formed at least on a side wall of said conductive film and a side wall of said second insulating film on said bit line exposed from said contact hole;

15 a capacitor connected to said second conductive plug, said capacitor having a storage node electrode electrically separated by the conductive film and said fifth insulating film on said bit line connected to said second conductive plug, a capacitor insulating film on the storage node electrode and a plate
20 electrode on the capacitor insulating film.

17. A device according to claim 16, wherein said third insulating film is a silicon nitride film, and said second and fourth insulating films are silicon oxide films.

25 18. A device according to claim 16, wherein said fifth insulating film is a silicon oxide film or a composite film of a silicon nitride film and a silicon

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oxide film, and has a smaller dielectric constant than a silicon nitride film.

19. A device according to claim 16, wherein said contact hole for the storage node is divided by a linear/space pattern which intersects perpendicularly to said bit lines.

20. A method of manufacturing a semiconductor storage device comprising the steps of:

forming a first insulating film on a semiconductor substrate;

forming a conductive film on said first insulating film;

forming a protective film on said conductive film; etching said protective film and conductive film locally and forming first and second wirings;

forming a second insulating film between said first and second wirings;

etching said second insulating film and first insulating film locally by using said protective film as a mask and forming a contact hole between said first and second wirings; and

forming a third insulating film at least on a side wall of said conductive film and on a side wall of said first insulating film in said contact hole.

21. A method according to claim 20, said step of forming said second insulating film between said first and second wirings comprises the steps of:

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25. A method according to claim 20,
wherein said protective film is composed of

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forming an element separation insulating film on a semiconductor substrate, for dividing an element region;

forming a gate electrode on the element region

forming a first insulating film for covering said
5 MOS transistor and said element separation insulating
film;

forming first and second conductive plug for
filling up said first and second contact holes;

etching said second insulating film locally and forming a bit line contact reaching said first conductive plug on said element separation insulating film;

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depositing said fourth insulating film on the whole surface; and

etching and removing said fourth insulating film up to an upper surface of said third insulating film so as to level the surface.

29. A method according to claim 27, wherein said
5 step of etching said fourth insulating film and said second insulating film locally by using said third insulating film as a mask and forming a storage node contact reaching said second conductive plug so that said storage node contact is self-aligned with said bit
10 line, comprises the steps of:

forming a linear/space photo-resist which intersects perpendicularly to said bit line; and

etching said fourth insulating film and said
15 second insulating film locally by using said photo-resist and said third insulating film as a mask.

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